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# Surgical Appraisal of Sphincter of Odii

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CITATION:

NAGASE, MASAO ...[et al]. Surgical Appraisal of Sphincter of Odii. 日本外科宝函 1975, 44(4): 365-369

ISSUE DATE:

1975-07-01

URL:

<http://hdl.handle.net/2433/208080>

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## Surgical Appraisal of Sphincter of Oddi

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Received for Publication April 10, 1975

### 1. Introduction

The functional and / or organic configuration of the sphincter of Oddi is an important factor in biliary and pancreatic surgery, evaluation of its patency, however, is not so easy as one might think of.

Wise<sup>1)</sup> has pointed out that the time-density factor in an intravenous cholangiography is valuable in diagnosing the function of the sphincter, but the method cannot be relied upon in a patient with the gallbladder present.

As for the intraoperative appraisal, some authors<sup>2)</sup> recommend the measurements of pressure in the common bile duct and / or radiomanometry, and others<sup>3),4)</sup> rely upon the passage of bougies such as Bakes' dilators.

In our hospital, both intraoperative cholangiography and passage of Bakes' dilators have been performed with rather excellent results obtained up to date. Recently, however, we have experienced some interesting cases regarding the technical problems of the intraoperative diagnostic measures.

### 2. Cases

Case 1: A 61 year old housewife was admitted to our hospital complaining of right upper abdominal pain, vomiting and fever.

A drip infusion cholangiogram showed the dilated common bile duct without stones. The gallbladder was not visualized (Fig. 1). Liver functions were total bilirubin 0.8mg/dl, GOT 31, GPT 44, Alkaline phosphatase 29.2 K.A.U., LAP 350 and LDH 225.

On laparotomy, the gallbladder was acutely inflamed and the common bile duct dilated to a diameter of 20mm, but no calculi were found anywhere. After cholecystectomy being done, the common bile duct was opened searching for any calculi, with none being found. A 6 mm Bakes' dilator was passed freely into the duodenum without any resistance.

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Key words : Bakes'dilator, Intraoperative cholangiography, Anomaly of the bile duct

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Fig. 1

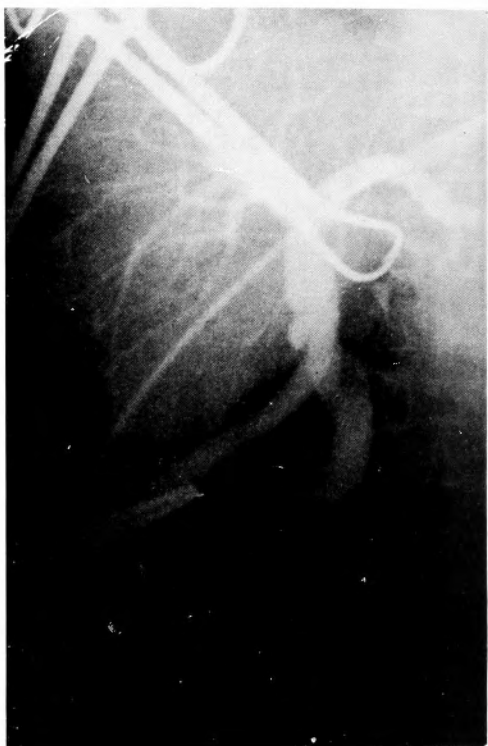


Fig. 2

Intraoperative cholangiography was done through a Nelaton's catheter. Although no residual stones were found anywhere, the contrast media (15% Urographin) did not flow into the duodenum under pressure of 30cm H<sub>2</sub>O. The contrast media was again injected forcibly by using a syringe. As shown in Fig. 2, the dye filled the small intrahepatic bile ducts, but did not flow into the duodenum again.

Since the 6mm Bakes' dilator was passed freely into the duodum, the operation was finished placing a No. 12 Nelaton's catheter in the common bile duct without duodenotomy.

Through the whole postoperative course the daily outflow of the bile from the Nelaton's catheter ranged from 300cc to 500cc, and there was neither jaundice nor acholic stool.

The daily urine volum, however, decreased suddenly to about 100cc on the first and second postoperative days. Peritoneal dialysis was done for four days and the patient recovered gradually. Liver functions were almost normal on the third postoperative day except for Alkaline phosphatase being high.

The postoperative cholangiogram on the 11th day showed a free flow of the dye into the duodenum (Fig. 3), and the patient was discharged on the 22nd day.

The stoppage of dye at the terminal portion of the common bile duct during the operation was supposedly caused by transient spasm of edema of that part due either to the passage of the dilator<sup>5)</sup> or to a supposed, preceeding passage of gallstones.

Although the mechanism by which the postoperative oliguria was induced is not clear, injection of the dye under high pressure might cause reflux of the dye and intraductal bile

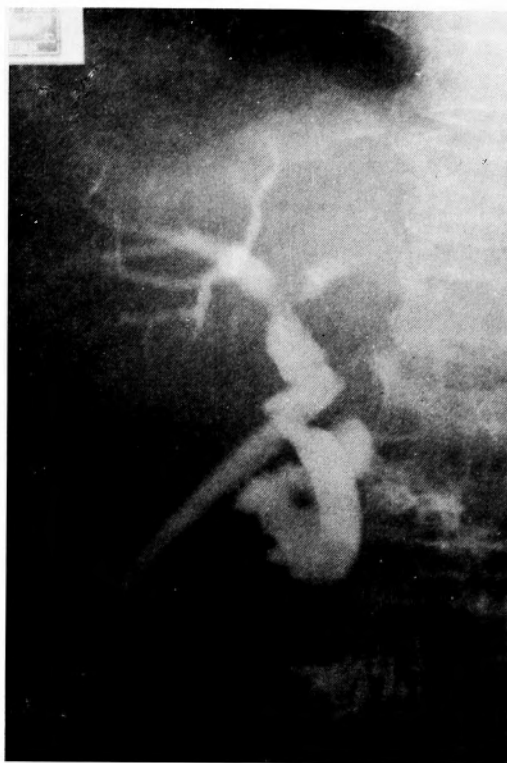


Fig. 3

into the blood stream and then induce a renal damage.

Case 2 : A 64 year old housewife was admitted to our hospital complaining of right upper abdominal pain and jaundice.

The whole biliary tracts were not visualized by both oral and intravenous cholangiographies. Liver functions were total bilirubin 2.8mg/dl, Alkaline phosphatase 67.1 K.A.U., GOT 45, GPT 37, LAP 765, and LDH 185.

On laparotomy, many inflammatory faceted stones were found in the gallbladder, and the common bile duct was dilated to a diameter of 17mm. The gallbladder was removed, and the common bile duct was opened, in which no stones were found at first, but a 3 mm Bakes' dilator could not be passed into the duodenum. An intraoperative cholangiogram demonstrated the occlusion of the terminal portion of the common bile duct (Fig. 4).

The distal common bile duct was washed out with physiological saline through a Nelaton's catheter for several times, and a faceted soybean-sized stone was gained, but the 3 mm Bakes' dilator could still not be passed into the duodenum.

A repeated cholangiogram revealed that the common bile duct entered the third portion of the duodenum (Fig. 5), and a 6 mm Bakes' dilator inserted in a more vertical direction was passed freely into the duodenum. The postoperative course was uneventful and the patient was discharged on the 24th day.

If the anomaly of the common bile duct, of which incidence is reported to be about 8 per cent<sup>5)</sup>, was born in mind, the operation might be much more easily achieved.

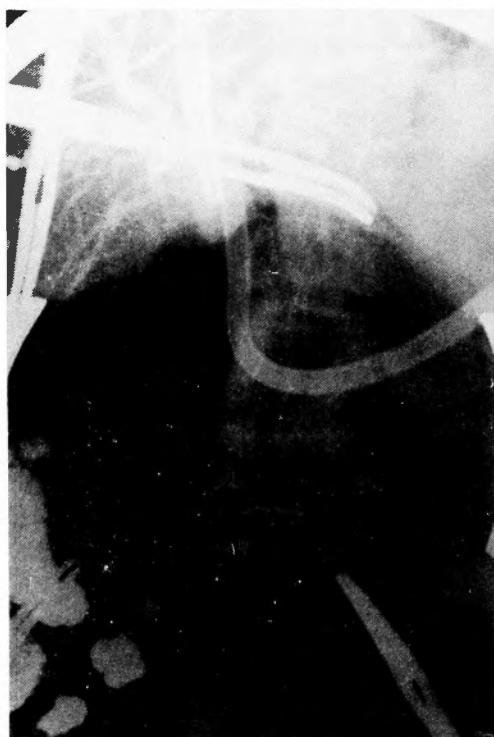


Fig. 4



Fig. 5

### 3. Discussion

Although some surgeons are prone to do a transduodenal evaluation of the sphincter of Oddi, the functional and/or organic configuration of that part cannot always be clarified even by direct inspection and palpation, and histologic studies of biopsy specimens are not only hazardous but also frequently inconclusive<sup>1)</sup>. And a duodenotomy, being not always without ill effects, should be avoided as far as possible.

Among several kinds of transcholedochal procedures, measurement of pressure in the common bile duct and/or radiomanometry and passage of some bougies are performed most commonly in surgical practices.

In our hospital, the dilated common bile duct is opened and the patency of its terminal portion is evaluated both by intraoperative cholangiography and by passage of Bakes' dilators, the diameter of which ranging from 3 mm to 6 mm. The stalks of our dilators are not elastic but malleable in order to avoid mechanical injuries upon the biliary tracts.

By these procedures, rather excellent results have been obtained in 490 cases of cholelithiasis operated on during the period of from 1954 to 1974. The two cases herein reported, however, presented some difficulties in the appraisal of the sphincter of Oddi.

The case 1 showed that passage of Bakes' dilators and flow of the dye into the duodenum did not always coincide and that intracholedochal injection under high pressure should be avoided.

From the case 2, the authors have known repeatedly that the anatomic anomalies of the biliary tract are not infrequent and should be always born in mind at biliary surgeries<sup>6)</sup>.

#### 4. Summary

Two cases are presented of biliary surgeries, which were burdened with some difficulties in surgical appraisal of the sphincter of Oddi, and a brief discussion is made on procedures for transcholedochal appraisal of the sphincter of Oddi.

Acknowledgement : The authors wish to express their sincere gratitude to Prof. Dr. YORINORI HIKASA of the Second Surgical Department of Kyoto University Hospital for his kind guidance.

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#### 和文抄録

### 総胆管末端部通過性の判定法について

—— 2 症例の経験から ——

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総胆管末端部の通過性は胆道外科において重要な問題の一つであるが、その術中判定法としては、胆道内圧の測定、ラヂオマンメトリー、ブジーの挿入などが行なわれている。

われわれは術中胆道造影法と Bakes の Dilator の挿入とを併せ行なっているが、最近経験した2例

(Dilator 挿入後、造影剤が十二指腸内へ流入しなかった1例と、総胆管が十二指腸の第3部に開口し、その場に結石が嵌頓していたために手術操作に難渋した1例)の概要を報告し、総胆管末端部通過性の判定法について論じた。